AMINO ACID CONTENT IN *Oreochromis niloticus* FROM FOUR RIVERS IN BAYELSA STATE (Tombia River, Otuokpoti River, Swalli River and Amassoma River).

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Abstract: The monomers of Protein are amino acids which are important biomolecules that regulate key metabolic pathways and serve as precursors for synthesis of biologically important substances. Fish is an important dietary source of animal proteins. The objective of this investigation was to determine the analysis of amino acid content in *Oreochromis niloticus* from four rivers in Bayelsa state. The amino acid composition was determined by Association of analytical chemist (AOAC) method and analyzed by Gas chromatography. Results have shown several differences in essential and non-essential amino acids in four fishes.

Keywords: *Oreochromis niloticus*, Amino acids, Bayelsa State, Gas chromatography.

I. INTRODUCTION

Amino acids are very important biomolecule that both serve as a building block of protein and as intermediate in various metabolic pathways (Scot *et al*., 2006). They serve as a precursor for the synthesis of wide range biological important substances including neurotransmitters, nucleotides and peptide hormones (Lourenco *et al*., 2002).

All proteins found in the human body are built from a repertoire of twenty (20) amino acids. The first 20 amino acid to be discovered was asparagines in 1806 and the last of the twenty to be found is threonine which was not identified until 1938. They differ from each other in their side chains which vary in structure, size and electric charge and which influences the solubility of amino acid in water (Park, 2006); others are amino acids present in living organisms but not as constituents of proteins.

Amino acid play important role in cell signaling, act as regulators of gene expression, nutrient transport, protein phosphorylation cascade and metabolism in animal cells. It is mainly obtained from proteins in diet and the quality of dietary proteins is used from essential to non essential amino acid ratio (Simoni *et al*., 2002)). High quality proteins are readily digestible and contain the dietary essential amino acid (EAA) in quantities that correspond to human requirements. Protein is necessary for key body function including provision of essential amino acid and development and maintenance of the muscles (Twafik, 2009). Inadequate uptake of quality proteins and calories in diet leads to protein energy malnutrition which is the most lethal form of malnutrition. Kwashiorkor / marasmus, the extreme condition of protein energy malnutrition mostly observed in children are caused by chronic deficiency of protein and energy respectively. Fish can play a vital role as it is an important and cheaper source of animal protein (Adeyeye, 2009).

This research was undertaken to generate information on the amino acid content in *Oreochromis niloticus* from Tombia, Otuokpoti, Swalli and Amassoma River, Bayelsa state, Nigeria.

II. MATERIALS AND METHODS

2.1 Sample collection and processing. Freshly caught fishes were collected from Tombia, Otuokpoti, Swalli and Amassoma River, and were brought to the labouratory. A total of 4 fishes (*Oreochromis niloticus*) were included for amino acid profiling. Fishes were cleaned, descaled, degutted, minced, pulverized and stored until used.

Modified Association of Analytical Chemists (AOAC) method 982.30, 2006 was followed in the extraction of the sample for the amino acid analysis. At room temperature, the dried and pulverized sample was further dried to constant weight, where 10.0g of sample was weighed into a 250ml cornical flask. 30ml of the petroleum spirit was used to extract the fat content of the sample with soxhlet extractor equipped with thimble.

The sample was afterwards hydrolyzed three times for complete hydrolysis so as to achieve total of amino acid recovery. 30ml of the 1M KOH solution was used to soak the pulverized and defatted sample and then incubated for 48hours at a temperature of 110ºc in hermetically closed borosilicate glass container. After the alkaline hydrolysis, the hydrolysate was neutralized to a pH of 5.0. The solution was purified by cation exchange sold-phase extraction.

Ethylchloroformate was used for derivation of amino acids in purified solution. The derivatising was removed by scavenging with nitrogen gas for proper mop up of the excess reagent. The amino acid was made up of 1ml in a vial for gas chromatography analysis. All data have been presented as mean ± standard deviation.

III. RESULTS AND DISCUSSION

Table 1: Amino acids values of *Oreochromis niloticus* from the stated locations

	Sampling locations			
Amino acids	Otuokpoti	Amassoma	Swalli	Tombia
Alanine	6.23±0.01^{d}	4.49±0.00^{a}	5.52±0.01^{b}	5.54±0.01^{c}
Serine	4.85±0.01^{d}	3.07±0.00^{c}	1.75±0.02^{b}	2.57±0.01^{b}
Proline	3.17±0.01^{c}	2.18±0.01^{b}	3.29±0.01^{d}	1.94±0.01^{a}
Valine	5.15±0.01^{c}	1.14±0.01^{b}	3.29±0.01^{a}	3.30±0.00^{a}
Threnonie	4.88±0.01^{d}	3.83±0.01^{c}	2.73±0.01^{a}	3.05±0.01^{b}
Isoleucine	5.04±0.01^{c}	4.19±0.01^{c}	3.32±0.02^{b}	2.98±0.01^{a}
Leucine	9.62±0.00^{d}	5.46±0.01^{a}	8.39±0.00^{c}	7.76±0.01^{a}
Aspartate	9.49±0.01^{d}	7.49±0.00^{a}	8.44±0.02^{c}	7.61±0.01^{b}
Lysine	10.27±0.01^{d}	7.59±0.01^{a}	9.09±0.01^{c}	7.84±0.01^{b}
Methionine	2.08±0.01^{d}	1.60±0.01^{c}	1.16±0.02^{b}	1.13±0.01^{a}
Glutamate	2.36±0.01^{d}	1.33±0.01^{b}	1.11±0.01^{a}	1.45±0.02^{c}
Phenylalanine	9.29±0.01^{d}	3.82±0.01^{b}	2.66±0.01^{a}	8.84±0.02^{c}
Histidine	3.68±0.01^{c}	5.64±0.01^{d}	2.05±0.01^{b}	1.75±0.02^{a}
Arginine	8.36±0.01^{d}	5.64±0.01^{b}	4.03±0.01^{a}	7.67±0.01^{c}
Tyrosine	2.95±0.01^{d}	1.57±0.01^{b}	1.26±0.02^{a}	1.74±0.02^{c}
Tryptophan	1.95±0.01^{d}	0.72±0.01^{b}	0.54±0.02^{a}	0.79±0.00^{c}
Cysteine	1.26±0.01^{d}	0.61±0.01^{a}	0.95±0.01^{c}	0.83±0.01^{b}

Mean in the same column and superscript indicates a non significant difference (P>0.05).

The mean ± SD of amino acid content in *Oreochromis nitoticus* from Tombia, Otuokpoti, Swalli and Amassoma River, in Bayelsa state Nigeria is presented above.

Amino acids in Otuopkoti River indicates a higher significant different in Alanine (6.23±0.01) than the four other rivers where Amassoma (4.49±0.00) indicates a lower amino acid content when compared with the other rivers. Fishes (*Oreochromis niloticus)* from Otuopkpoti River showed highest values in amino acid content mostly Lysine (10.27±0.01) compared to Tombia, Swalli and Amassoma River, while *Oreochromis niloticus* from Amassoma River showed lowest amino acid values mostly cysteine (0.61±0.01). The variation may be due to different diets in both Rivers (Kim, et al 1992). These changes may be caused by oil spillage and environmental temperature in both Rivers (Kim and Mendis, 2006).

From the table given, there was no significant decrease ($P>0.05$). In above it was observed that variation changes in Tombia, Otuokpoti, Swalli and Amassoma River may be caused by the climate change in the month of December in *Oreochromis niloticus*.

IV. CONCLUSION

The findings of the present study reveal the importance of *Oreochromis niloticus* as good sources of protein. On the other hand the information will be useful to consumers in choosing fish based on their nutritional content rather than taste, appearance and other physical factors.

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